0025

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor
Ted Stewart
Executive Director
James W. Carter
Division Director

1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801
801-538-5340
801-359-3940 (Fax)
801-538-7223 (TDD)

February 23, 1998

TO: File

THRU: Joe Helfrich, Daron Haddock, Permit Supervisor's

FROM: Sharon Falvey, Senior Reclamation Specialist SF

RE: Notice of Violation N97-45-1-1 Response, Horizon Coal Company, Horizon Mine, ACT/007/020-97F-3, 2/09/98, Folder #2, Carbon County, Utah

SYNOPSIS

This violation has resulted in a need to re-establish the final reclamation of the site. This review is focused on the final surface configuration. Applicable portions of the Technical Analyses (TA) should incorporated into the next TA update.

ANALYSIS

Reclamation Plan

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Grading to Drain and Approximate Original Contour

The plan provides a commitment to keep surface drainage from entering sealed entries in section 3.5.3.1. The plan also commits to re-contour the area to drain to the final reclamation channel in section 3-25. Plate 3-7 shows the final reclamation topography which provides drainage from the site and approximates the original pre-mining contour of this site.

Diversions.

The drainage plan re-configures Jewkes Creek's and Portal Canyon. The new configuration of Portal Canyon eliminates the basin behind a pre-existing coal waste embankment. The centrally-located channel section is placed away from the toe of steep backfilled slopes.

Portal Canyon was designed to carry a peak flow of 9.95 cfs. The analysis assumed a one foot flow line because no high water mark was found. Since this is an ephemeral system it is often difficult to determine the height of the channel forming flows. Typically the channel forming flows are high intensity short durations events in ephemeral systems. Based on the presented information the design capacity of this channel exceeds the minimum required design flow for an ephemeral system. The Portal Canyon channel design allows a maximum slope of 0.167 ft /ft and a minimum slope of 0.038 ft/ft.

The Upper Jewkes Creek channel is designed to carry 143.5 cfs in the combined channel and flood plain configuration while, the Lower Jewkes Creek channel is designed to handle a combined channel and flood plain flow of 150.6 cfs. The estimated capacity of the upper end of the disturbance was 27.65 cfs based on a high water mark. The estimated capacity of the downstream channel below the disturbance was determined to be 38.7 cfs. The reclamation channel capacity downstream is designed to exceed the capacity of the Jewkes Creek channel upstream and down stream of the site based on presented design information. The design will allow a 100-year, 6-hour event to pass through the channel and flood plain configuration.

The Jewkes Creek channel design is intended to provide a means to re-establish the riparian vegetation, existing at the site prior to disturbance, and is intended to simulate the pre-mining channel configuration while considering other site conditions. Some issues that are related to the success of the design are based on the hydraulic characteristics of the soil adjacent to the channel, the gradient downstream of the site and, the amount of sediment and the intensity of flows being transported through the system. A small riprapped channel section is designed to carry a low flow from the 10-year, 6-hour event. A sand filter blanket is provided to promote recharge into the surrounding soils.

According to Rosgren's Classification system Jewkes Creek would approximate an "E stream type" configuration. The channel type is based on characteristics of the existing stream gradient assuming a moderate sediment supply and healthy vegetation. The classic channel under these conditions would have a width to depth ratio less than 12, an entrenchment ratio grater than 2.2, a sinuosity greater than 1.5 and, a surface water slope less than 0.02. Because there is a high sediment load in the existing system (upstream logging presently occurring) and because the potential for additional flows from the reclaimed channel section and an increased slope, a channel more closely resembling a "C stream type" might be more appropriate. This design attempts to incorporate protection for a wider channel while promoting a narrow flow line for low flow periods.

The upper channel RD-2 is designed to include channel slope ranging from 0.013 to 0.087 ft/ft. Loose rock check dams, 1.5 ft high with a designed spillway, and apron will be installed at upstream and downstream locations. The most efficient spacing is to place the check dams at the upstream toe of the deposition behind the previous check dam (Heede, 1976). To determine this distance, for an initial gradient less than 20%, the deposition behind the slope is approximately 0.7 of the initial gradient. The sediment would deposit behind the dams with slopes of 0.009 and 0.061 ft/ft. A spacing of approximately 167 linear feet is appropriate where the channel slope is 0.013 ft/ft and a spacing of approximately 25 linear feet is appropriate for the 0.087 ft/ft channel slope.

The lower channel RD-3 is designed to include a channel slope ranging from 0.022 to 0.10 ft/ft. The lower portion will have check dams while the upper section will not incorporate check dams. The design provides a small channel within a larger channel to construct a flood plain while providing stability. The typical bottom width of the flood plain is 30 feet while the base channel will be 8 feet wide and contain the low check dam with a four foot wide notched spillway. The sediment would deposit behind the dams with slopes of 0.016 and 0.07 ft/ft. A spacing of approximately 89 linear feet is proposed to be used where check dams are located within the

minimum channel slope and a spacing of approximately 19 linear feet is proposed to be used when check dams are located within the maximum channel slope.

Intuitively, it seems the steeper gradient sections would not contain the check dams and the and flatter gradient would be used to establish the vegetated riparian area. The intent of the design is to increase the potential for riparian vegetation within the higher gradient areas with the check dams. These check dams are more vulnerable to failure in these steeper slope segments. The ability of this design to be stable may be measured through the ability of the design to withstand flows received at the site. The proposed design eliminates check dam keys. These were determined unnecessary by the designer because they are surrounded with the channel filter blanket. Check dam keys are designed to anchor the structure and to retain flow within the channel preventing water from cutting around the structure. Cutting usually occurs once sediment is deposited behind the structure and water spills over the length of the dam. Should failure occur, design reconstruction may be necessary. The proposed design considers the site conditions and the goals of reclamation and meets the regulatory requirements for design flow.

During reclamation the 4 inch pipeline from Sweets Pond to the mine site will be disconnected, the end of the pipes will be plugged and, the pipeline abandoned in place. The reclamation for this site should be performed in a timely manner since it is no longer proposed to be used.

Findings:

The permittee meets the minimum requirements for this section.

Recommendation:

This amendment should be approved and incorporated into the plan.

cc: William Malencik, PFO
O:\007020.HZN\FINAL\N974511F.WPD